



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,655	10/20/2003	Jun Koyama	0756-7206	4423

31780 7590 11/08/2006

ERIC ROBINSON
PMB 955
21010 SOUTHBANK ST.
POTOMAC FALLS, VA 20165

EXAMINER

LUI, DONNA V

ART UNIT	PAPER NUMBER
2629	

DATE MAILED: 11/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/687,655	KOYAMA, JUN	
	Examiner	Art Unit	
	Donna V. Lui	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2006.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-6, 10, 11, 14, 15, 18, 19 and 21-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-6, 10, 11, 14, 15, 18, 19 and 21-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. **Claim 2** is objected to because of the following informalities: grammatical error. The following is a suggestion for correction.

Claim 2, line 8: "a switching element formed over the substrate; ~~and~~"

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. **Claim 4** recites the limitation "the frequency varying unit" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 2-6, 10-11, 18-19, and 21-25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagi et al. (Pub. No.: US 2002/0036636 A1) in view of Ayres (Pub. No.: US 2001/0007432 A1).

With respect to **Claim 2**, Yanagi teaches a display device comprising: a substrate ([0088]; glass substrate); a pixel portion comprising a plurality of pixels formed over the

Art Unit: 2629

substrate (*See figure 14; [0088], lines 1-10*); a driving circuit which controls the pixel portion (*See figure 21; elements 5 and 6*); a charge pump circuit (*See figure 21, elements 22, 23 and 32*) which supplies a voltage to the driving circuit (*[0012]*), the charge pump circuit comprising: a switching element (*See figure 12, SW1*); a capacitor (*See figure 12, C1*); and a charge pump control circuit (*See figure 21, element 32: operation mode controller ~ is a component of the charge pump control circuit, where element 32 controls the charge pump circuit through the signal CNT; note that the charge pump control circuit comprises the charge pump circuit*) which controls the charge pump circuit.

Yanagi does not mention the driving circuit, a switching element, nor a charge pump control circuit formed over the substrate.

Ayres teaches an active matrix liquid crystal display (*See figure 4, element 32: active matrix liquid crystal display*), a switching element (*See figure 1, element 10*), a charge pump circuit (*See figure 1: charge pump; note that the charge pump is comprised of a switching element*), and a charge pump control circuit (*See figure 4, element 31: integrated circuit device; [0007], last two lines*) formed over a common substrate (*substrate is equivalent to low temperature poly-silicon; [0005], lines 1-3; [0015], lines 1-4; See figure 4*).

Ayres modifies the display device of Yanagi by replacing the switching elements with PIN diodes and forming the driving circuit, charge pump circuit, switching element, a charge pump circuit, and a charge pump control circuit on a common substrate (*[0007]; [0015]*).

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have the driving circuit, the switching elements, charge pump circuit, and the charge pump control circuit formed over a common substrate, as taught by Ayres, to the

Art Unit: 2629

display device of Yanagi so as to enable the charge pump circuit to be formed using the same thin-film processing as may be required for other elements of the circuit, and enabling higher voltage TFT circuitry ([0007]).

With respect to **Claim 3**, a display device according to claim 2, Yanagi teaches the charge pump control circuit can vary a clock frequency to input to the switching element ([0074], lines 1-8).

With respect to **Claim 4**, a display device according to claim 2, Yanagi teaches a frequency varying unit is controlled by a CPU (*See figure 21, element 32: operation mode controller ~ CPU; See figure 17, element 11a is equivalent to a frequency varying unit; note that the control signal CNT inputted to the charge-pump power supply (shown in figure 12) through the element 11*).

With respect to **Claim 5**, a display device according to claim 4, Yanagi teaches the CPU is comprised of a thin film transistor (*See figure 6 and 14, 2: TFT panel*). Note that a CPU is a semiconductor as are thin film transistors, therefore it would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a CPU comprised of thin film transistors in the display device of Yanagi so as to have a faster response time and higher reliability, characteristic of a thin film transistor.

Art Unit: 2629

With respect to **Claim 10**, a display device according to claim 2, Yanagi teaches the display device is a liquid crystal display device ([0043], lines 1-3).

With respect to **Claim 18**, a display device according to, Yanagi teaches a display device wherein the display device is applied to portable electrical equipment such as a portable phone ([0172]).

With respect to **Claim 21**, a display device according to claim 2, Yanagi teaches the switching element is a transistor (See figure 12, element SW1; [0074], lines 11-14).

With respect to **Claim 22**, a display device according to claim 21, Yanagi does not teach the transistor is a thin film transistor. However, it would have been obvious for a person of ordinary skill in the art at the time the invention was made to use thin film transistors as the switching element if the display device of Yanagi so as to have a faster response time and higher reliability, characteristic of a thin film transistor.

With respect to **Claim 23**, a display device according to claim 2, Yanagi does not teach the switching element is a diode.

Ayres teaches the switching element is a diode (See figure 1, element 10; [0028]).

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to use a switching element that is a diode, as taught by Ayres, to the display

Art Unit: 2629

device of Yanagi, so as to enable the charge pump circuit to operate from a lower supply voltage than is possible with the use of TFTs ([0007], lines 1-3).

With respect to **Claim 24**, a display device according to claim 23, Yanagi does not teach the switching element is a PIN diode.

Ayres teaches the switching element is a PIN diode (See figure 1, element 10; [0028]).

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to use a switching element that is a PIN diode, as taught by Ayres, to the display device of Yanagi, so as to reduce the resistance of the switching element without the increase in shunt capacitance ([0028]) and to enable the charge pump circuit to operate from a lower supply voltage than is possible with the use of TFTs ([0007], lines 1-3).

With respect to **Claim 25**, a display device of Yanagi as modified by Ayres according to claim 2 teaches the charge pump control circuit comprises: a variable frequency-dividing circuit formed over the substrate; and a processing circuit formed over the substrate, which controls the variable frequency-dividing circuit.

4. **Claims 6, 11, and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagi.

With respect to **Claim 6**, Yanagi teaches a display device comprising: a variable frequency-dividing circuit comprising a transistor ([0121], figure 17); and a CPU comprising a

Art Unit: 2629

thin film transistor (*See figure 6, 32: operation mode controller~ CPU, [0050], line 1*), wherein the variable frequency-dividing circuit is controlled by the CPU (*the control signal is CNT*), and wherein a dividing ratio is varied according to a display mode (*[0095]; [0096]; note that since CNT is dependent on the power save signal/mode then the dividing ratio is also dependent on the power save signal/mode*). Although figure 17 shows the use of a field effect transistor it would have been obvious for a person of ordinary skill in the art at the time the invention was made to use thin film transistors in the frequency-dividing circuit of Yanagi so as to have a faster response time and higher reliability, characteristic of a thin film transistor.

With respect to **Claim 11**, a display device according to claim 6, Yanagi teaches the display device is a liquid crystal display device (*[0043], lines 1-3*).

With respect to **Claim 19**, a display device according to claim 6, Yanagi teaches a display device wherein the display device is applied to portable electrical equipment such as a portable phone (*[0172]*).

5. **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagi and Ayres as applied to claim 2 above, and further in view of Nakajima (Pub. No.: US 2003/0011586 A1).

With respect to **Claims 14 and 15**, Yanagi does not teach the display device is an EL display device.

Nakajima teaches the display device an EL display device ([0181], lines 5-9; the charge pump circuit is applicable to both an LCD and EL display).

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to teach the display device as an EL display device, as taught by Nakajima, to the display of Yanagi, so as to have greater versatility in implementing such a device.

6. **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagi as applied to claim 6 above, and further in view of Nakajima.

With respect to **Claim 15**, Yanagi does not teach the display device is an EL display device.

Nakajima teaches the display device an EL display device ([0181], lines 5-9; the charge pump circuit is applicable to both an LCD and EL display).

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to teach the display device as an EL display device, as taught by Nakajima, to the display of Yanagi, so as to have greater versatility in implementing such a device.

Response to Arguments

7. Applicant's arguments filed 8/21/2006 have been fully considered but they are not persuasive.

Applicant argues that Yanagi fails to disclose that the CPU controls the frequency divider.

The examiner respectfully disagrees. Yanagi teaches an operation mode controller (*See figure 21, element 32*) which is equivalent to a CPU, controls the frequency divider (*See figure 17, element 52*). As shown in figure 17, the signal CNT outputted from the operation mode controller is used to vary the dividing ratio of the frequency divider (*[0121]*), which is analogous to the CPU of the instant application (*See figure 7 of applicant, where the CPU outputs a signal to control elements 711 and 712 to control the output of the switches 706 to 709*).

8. Applicant's arguments with respect to claims 2-5 10, 14, 18, and 21-25 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Art Unit: 2629

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donna V. Lui whose telephone number is (571) 272-4920. The examiner can normally be reached on Monday through Friday 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571)272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Donna V Lui
Examiner
Art Unit 2629

AMR A. AWAD
SUPERVISORY PATENT EXAMINER

